
Rule WLM633: An outbound path was non-operational

Finding: CPEXpert noticed that the indicated outbound path was non-operational in the transport class described by this rule.

Impact: This finding can have a LOW IMPACT, MEDIUM IMPACT, or IMPACT on the signalling performance of the sysplex. The level of impact depends on the message traffic and the capacity of the outbound paths assigned to the transport class.

Logic flow: This a basic finding. There are no predecessor rules.

Discussion: The XCF component of MVS/ESA allows authorized programs on one MVS system in a sysplex to communicate with programs on the same system or on other systems. A typical example of this communication is between CICS regions; CICS regions often communicate with other CICS regions in the same system or with CICS regions on other systems in the sysplex.

Please refer to the discussion associated with Rule WLM601 for additional information about XCF buffers.

XCF group members communicate with each other using the XCF *signalling* mechanism. The communication is done via signalling paths consisting of ESCON channels operating in channel-to-channel (CTC) mode, a coupling facility list structure (beginning with MVS/ESA Version 5), or 3088 Multisystem Channel Communication Unit. Messages are sent over the signalling paths, and the paths have one or more buffers associated with them to hold the messages as they are sent or received.

An outbound path can be non-operational because of a hardware failure in which the number of time XCF had to retry the path was larger than the value of the RETRY parameter on the PATHOUT statement. This condition results in an message to the operator (and CPEXpert would generate Rule WLM630 if the hardware failure occurred during RMF intervals being analyzed).

A more insidious cause of a path being non-operational is that an error has been made in the path definition: an outbound path has been defined but no corresponding inbound path has been defined.

Alternatively, a system operator might have made an error:

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- The operator could have issued a SETXCF START,PATHOUT command to start an outbound path but did not issue a SETXCF START,PATHIN command to start the corresponding inbound path on the other system.
 - The operator could have issued a SETXCF DELETE,PATHIN command to delete an inbound path but did not issue a SETXCF DELETE,PATHOUT command to delete the corresponding outbound path on the other system.

In any of the above cases, the outbound path is defined to XCF, but XCF cannot use the path. This situation wastes resources and lowers the capacity of the signalling system.

SMF Type 74 (Subtype 2) provides statistics about the status of each path in the R742PSTA status flags:

Bit	Meaning when set ¹
0	Path starting
1	Path restarting
2	Path working
3	Path stopping
4	Path waiting for completion of initial protocol
5	Path not operational
6	Path stop failed
7	Path rebuilding

CPEXpert analyzes this information to determine whether a path has been defined to XCF but the path is not operational.

The following example illustrates the output from Rule WLM633:

Suggestion: If Rule WLM633 is produced, CPEXpert suggests that you identify the reason the path is not operational.

- Rule WLM630 would have been produced if the path is not operational because of hardware problems, and the retry limit had been reached during the RMF intervals being analyzed. In this case, you should determine and correct the hardware problems.

¹Please note that the SMF manual describes bits 5-7 as Reserved. Private communication with RMF developers at IBM, Germany revealed that bits 5-7 have the meaning shown above. The SMF manual will be updated with this information.

RULE WLM632: AN INBOUND PATH WAS NON-OPERATIONAL

The C594 inbound path was non-operational during the following RMF measurement intervals. The path was defined to XCF, but the path was not usable. A path is not usable by XCF because of hardware problems, or because the path on the other end (the outbound path of another system) was not defined or was not defined correctly.

MEASUREMENT INTERVAL
10:00-10:30,26MAR1996
10:30-11:00,26MAR1996
11:00-11:30,26MAR1996
11:30-12:00,26MAR1996
12:00-12:30,26MAR1996
12:30-13:00,26MAR1996
13:00-13:30,26MAR1996

If there are no hardware problems with the path, you should review the signalling path definitions.

- Review the path definition in the PATHOUT statement for the system identified. You should ensure that there is a corresponding PATHIN statement for the other system.
- If the path definition in the PATHIN and PATHOUT statements are correct, you should review operator actions to ensure that the operator has taken proper action when starting or deleting a path. Either of the two situations described above (in the Discussion section) could cause an outbound path to be non-operational.

Reference: MVS/ESA: Setting Up a Sysplex (GC28-1449)
Section 5: Planning Signalling Services in a Sysplex

MVS/ESA: Initialization and Tuning Reference (GC28-1452)
COUPLExx (Cross-System Coupling Facility Parameters)

OS/390: Setting Up a Sysplex (GC28-1779)
Section 5: Planning Signalling Services in a Sysplex

OS/390: Initialization and Tuning Reference (GC28-1752)
COUPLExx (Cross-System Coupling Facility Parameters)

z/OS: Setting Up a Sysplex (SA22-7625)
Section 5: Planning Signalling Services in a Sysplex

z/OS: Initialization and Tuning Reference (SA22-7592)
COUPLExx (Cross-System Coupling Facility Parameters)

"Parallel Sysplex Performance: tuning tips and techniques,"
Kelley, Joan (IBM, Poughkeepsie, NY), SHARE 86, February 1996.